Lubbock, and other gentlemen, have signified their intention of being present and supporting the resolutions which are to be submitted to the meeting.

We beg to refer those of our readers who are interested in this subject to the articles published during the past year in NATURE, and to the arguments advanced in support of the proposal to found such a laboratory, together with a sketch of the relation of zoological science to the well-being of British fisheries, in the address on the Scientific Results of the Fisheries Exhibition delivered by Prof. Ray Lankester at the conference on July 19, and published by the Exhibition Committee.

THE UNITY OF NATURE

The Unity of Nature. By the Duke of Argyll. (London: Strahan, 1884.)

THIS book is in our judgment a dreary failure. Although in the mere matter of style it is a well written popular exposition of what we may call the comfortable way of looking at things, in all matters of deeper importance it is utterly barren. Throughout its five or six hundred pages there is no single original observation in science, nor any single original thought in anything that deserves to be called philosophy. Moreover, if regarded only as an exposition, the first chapters are tedious on account of the redundant manner in which elementary science is explained, while the later chapters, in which the author's views on various philosophical questions are unfolded, display a feebleness of thought and argument which renders them even more tedious than the earlier ones. In short, the successive essays strongly remind us of a series of Scottish sermons. There is everywhere a narrow consistency in the doctrine, which is presented in a rhetorical precision of style; but the discussion never seems to get below the surface, while even surface difficulties are either unperceived or intentionally avoided. On this account the discussion itself tends to illustrate the principle of "unity" with which it is concerned; it begins, continues, and ends in a monotone. No matter how fearfully out of tune this may be with any of the notes struck by the greatest men of our time, the Duke of Argyll, like a Highland piper, is deaf to every other music, and drowns all else in the one continuous drone of his own particular instrument.

The pages of a scientific journal are not suited to an examination in any detail of the parts of the book to which these general remarks apply. We shall, therefore, proceed to examine the more purely scientific strands which are woven into the texture of the work. In this connection the chief topic which meets us is that of "Animal Instinct in Relation to the Mind of Man." Here the main question which is dealt with—that as to the mode of origin and development of instincts—appears to us most inefficiently treated. The object of the writer is to argue that the phenomena of instinct point directly to the design of a Creator, who correlates instinct with structure and environment. So far, of course, every evolutionist, who is also a theist, may go. But, in order to enforce this view, the Duke proceeds to argue that the phenomena in question are of so mysterious a nature that it is not possible to point to any causes of a proximate or physical kind which may reasonably be supposed to produce them. Now it would be easy to show—were this the place to show it—that the writer has here adopted a weak position even as an apologist; but, to consider the matter only from the side of science, surely it shows some grave want either of judgment or of consideration to make the kind of statements of which the following may be taken as fair examples:—

"I can therefore see no light in this new explanation to account for the existence of instincts which are certainly antecedent to all individual experience—the explanation, namely, that they are due to the experience of progenitors 'organised in the race.' It involves assumptions contrary to the analogies of nature, and at variance with the fundamental facts, which are the best, and indeed the only, basis of the theory of evolution. There is no probability—there is hardly any possibility—in the supposition that experience has had, in past times, some connection with instinct which it has ceased to have in the present day. . . . There was a time when animal life, and with it animal instincts, began to be. But we have no reason whatever to suppose that the nature of instinct then or since has ever been different from its nature now. On the contrary, as we have in nature examples of it in infinite variety, from the very lowest to the very highest forms of organisation, and as the same phenomena are everywhere repeated, we have the best reason to conclude that, in the past, animal instinct has ever been what we now see it to be—congenital, innate, and wholly independent of experience."

Such passages as these scarcely admit of comment, because all that can be said about them is that the writer has either never read, or has completely forgotten, the whole of the literature to which he alludes. No evolutionist has ever entertained the suicidal "supposition that experience has had, in past times, some connection with instinct which it has ceased to have in the present day;" and the conclusion that in the absence of so absurd a supposition the only alternative is to regard instinct as always having been wholly independent of experience is a conclusion which stands in direct opposition to all that constitutes "evolution" a "theory." Of course no one is bound to accept this theory; it may be rejected, or it may be left unmentioned; but it is futile to set up a nonsensical form of words, and then to call the absurdity the "theory of evolution."

And these are no mere chance expressions, which, if standing alone, might be indicative only of carelessness. The whole of the dissertation on instinct is pervaded by a similar misapprehension, or want of apprehension, of the fundamental ideas of the newer philosophy which the writer appears to suppose that he is considering. Thus, he fails to perceive that the doctrine of natural selection has any bearing upon the subject, while, with reference to the factor of what Mr. Darwin called "inherited habit," he says:—

"If the habits and powers which are now purely innate and instinctive were once less innate and more deliberate, then it will follow that the earlier faculties of animals have been higher, and that the later faculties are the lower in the scale of intelligence. This is hardly consistent with the accepted idea of evolution," &c.

Comment is needless. We shall, therefore, notice only one other point with reference to the essay on instinct,

and this is the difficulty which is thus manufactured to meet the experience theory.

"Did there ever exist in any former period of the world what, so far as I know, does certainly not exist now—any animal with dispositions to enter on a new career, thought of and imagined for the first time by itself, unconnected with any organs already fitted for and appropriate to the purpose? . . . The questions raised when a young dipper, which had never before seen the water, dives and swims with perfect ease, are questions which the theory of organised experience does not even tend to solve; on the contrary, it is a theory which leaves these questions precisely where they were, except in so far as it may tend to obscure them by obvious confusions of thought."

Here one would have thought that the writer need not have gone further than the instance which he himself gives to have found evidence of the growth of an instinct by the accumulation of hereditary experience or habit, and as yet unconnected with the "organs already fitted for and appropriate to the purpose." For the dipper belongs to a non-aquatic family of birds, and therefore has no organs specially adapted to its aquatic instincts. In particular it has no webs to its feet; and therefore, so far as the structure and affinities of the bird can in themselves argue anything, they speak most distinctly in favour of the view that the species must have developed aquatic instincts while not yet having had time to develop the "appropriate organs." It would be no answer to say that this *species* does not need these organs; else why are they needed by all the *families* of birds which present the same instincts? Or, conversely, can it be said that these same organs, *i.e.* webbed feet, stand in any special correlation with the existing instincts of the upland geese, which, being terrestrial in their habits (though aquatic in their affinities), never use them for swimming or diving? Short of historical or palæontological knowledge (which in the case of instinct is of course impossible), we could have no stronger evidence of transmutation than is afforded by these two complementary cases, in one of which the absence of a structure points to the recent acquisition of the instinct, while in the other the presence of this structure points to the former existence of the instinct now obsolete. Analogous cases occur in the species of ground-parrots and tree-frogs which, while retaining their ancestral structures adapted to climbing, have nevertheless entirely lost their arboreal instincts.

Moreover, a strange want of thought is shown by the remark that, so far as the writer knows, "there certainly does not exist now any animal with dispositions to enter on a new career, thought of and imagined for the first time by itself." It is enough to quote the complete change in the instincts of nidification which has been observed to take place in the house-sparrow, and in several species of swallow, since these birds first had the opportunity of building on houses; or the more recent and perhaps more remarkable case of the mountain parrot, which has been observed to manifest a "progressive development of change in habits from the simple tastes of a honey-eater to the savageness of a tearer of flesh." Many similar instances might be given, and, as showing that they are not uncommon, I may remark that a very instructive one is published by Dr. Rae in a recent number of this journal.

So much, then, for the Duke of Argyll's views on instinct. Scarcely less unsatisfactory are his views on rudimentary organs. The explanation which he adduces to account for these structures is, not that they are remnants of organs useful in the past, but that they are prophesies of organs which, when more fully developed, are to be of use in the future. We have no space to criticise at any length this wholly untenable inversion of Mr. Darwin's teaching; but we think it will be enough to notice the singularly unfortunate instance which the Duke selects to illustrate his theory. This instance is that of the whales, and he says that Mr. Darwin's views of the rudimentary organs here to be met with "obliges us to suppose that the ancestors of the whales were once terrestrial quadrupeds, and in that case we start with the conception of hind limbs, and of the quadrupedal mammal, fully formed and perfectly developed. Whereas, if we accept the possibility of useless organs being the beginnings and rudiments of structures which are there because the germ has always within it the tendency to produce them, then we catch sight of an idea which has the double advantage of going nearer to the origin of species, and of being in harmony with the analogy of natural operations as we see them now." Is not this enough? When we remember the eloquence, as it were, with which the whole organisation of the Cetacea tells us of their having been originally, like other mammals, terrestrial, it seems that the Duke could have chosen no worse example whereby to illustrate his hypothesis.

Passing now to the long discussion of the question whether savages should be regarded as the product of evolution from lower levels of human life, or of degradation from higher levels, we may say in general terms that by adopting the latter hypothesis as applying to all savages, the Duke sets himself in opposition to the theory of evolution as a whole. Moreover, he does not appear to have reflected that the question is not one which can be investigated or decided, as it were, in the lump. It is quite likely that some savages have fallen from a higher to a lower level of savagery; it by no means follows that all savages have done the same. Further, if we were to suppose that they did, from what level of civilised or of uncivilised life are we to suppose that they all started? This hypothesis, as a general explanation of the savage state of man is, indeed, as incoherent as it is obsolete; yet it is not more so than certain other views upon the savage state to which this writer gives expression. Thus, his chief contention is that savage man shows himself to be, as it were, out of joint with the rest of Nature, or, as he expresses it, an "evident departure" from the unity or order of Nature. Perhaps it is enough to say of a doctrine which from a scientific point of view is so peculiar, that it ought to have prevented the author from styling his book "The Unity of Nature."

We have no space left to consider the only other topic that calls for consideration in these columns, viz. the essay on the Moral Sense. The whole treatment of this subject appears to us most feeble. It is also most inaccurate, as the following quotation will suffice to show:—

"It has been laid down that evolution, in its most perfect conception, would be such that the development of every creature would be compatible with the equal development of every other. In such a system it is said there would be no 'struggle for existence—no harmful competition, no mutual devouring—no death' (Herbert Spencer, 'Data of Ethics,' chap. ii. pp. 18, 19). The inspired imaginings of the Jewish prophets of some future time when the lion shall lie down with the lamb, and the ideas which have clustered round the Christian heaven, are more probably the real origin of this conception than any theory of evolution founded on the facts and laws of nature."

It is needless to say that no more ridiculous travesty than this could well be imagined, or that no such absurdity as that which professes to be formally quoted from Mr. Spencer is to be found either under the reference given or in any other part of his writings. In short, this "most perfect conception" of evolution is a pure invention, which reads almost as if it were intended to misinform the uninformed. We do not, however, suppose that such is the case. This extreme of inaccuracy we take to have been reached by the habit of drawing upon "inner consciousness," until not only the whole sense and substance of other writings are perverted, but even the most pure and delicious nonsense is seen by "the mind's eye" to occur in particular words on a particular page of some other book.

If space permitted or need required, we could point out other inaccuracies, and even still greater absurdities, both in this chapter and elsewhere; but we have doubtless already said more than enough to show that "The Unity of Nature" can scarcely be considered a successful work from a scientific point of view.

GEORGE J. ROMANES

OUR BOOK SHELF

The Electrician's Directory, with Handbook for 1884. 67 pp. (London: *Electrician* Office, 1884.)

THIS work, now in the second year of publication, contains much information of use to electric and telegraphic engineers. Amongst its contents are comprised a list of new electric companies, a list of provisional orders granted by Parliament for electric lighting, a list of the "British Cable Fleet," a list of British railways and railway officials, a fairly complete directory of the professions and trades connected with electricity; also a large amount of statistical information about different kinds of dynamo machines, electric lamps, and telegraph tariffs, much of which will doubtless be out of date in twelve months' time. There is also an obituary of electricians deceased in 1883, a table by Mr. Geipel of the cost of electric conductors as calculated by Sir W. Thomson's formula, and a set of tables by Mr. Crawley for corrections of measurements in horse-power and in watts. These two sets of tables are the only portion of the work claiming independent scientific value. We object entirely to Mr. Crawley's gratuitous remark in the prefatory paragraph of his section that the accepted system of electric units was "really foisted upon electricians by men devoted more to theoretic than to practical work." Nothing could be further from the truth than to accuse Mr. Latimer Clark, Sir Charles Bright, who originated the system, and Sir William Thomson, who did so much to perfect it, of not being practical workers. As a matter of fact, *ohms*, *volts*, *farads*, and *webers* were used by practical electricians for years before they found their way into the text-books written by the theorists.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.*]

On a "Magnetic Sense"

SIR WILLIAM THOMSON, in his presidential address at the Midland Institute, which is reported in NATURE for March 6 (p. 438), draws attention to the marvellous fact that hitherto we have no evidence to show that even the most powerful electromagnets can produce the slightest effect upon a living vegetable or animal body. But Sir William "thinks it possible that an exceedingly powerful magnetic effect may produce a sensation that we cannot compare with heat, or force, or any other sensation," and hence he cannot admit that the investigation of this question is completed,—for although the two eminent experimenters named by Sir W. Thomson felt nothing when they put their heads between the poles of a powerful electromagnet, it does not follow that, therefore, every member of the human race would feel nothing.

May I be permitted to point out that some slight evidence already exists in the direction sought by Sir W. Thomson? Scattered in different publications there are numerous statements made by different observers in different countries during the present century, which, if trustworthy, indicate that upon certain human organisms a powerful magnet does produce a very distinct and often profound effect. Unfortunately, with the exception of the careful and excellent observations made by Dr. W. H. Stone, who tried Charcot's experiments on a patient of his at St. Thomas's Hospital, the observations referred to are singularly wanting in precision of statement and in a due recognition of the precautions needful in order to avoid fallacious or ambiguous results from illusions of the senses.

This being the case, an attempt is being made by the Society for Psychical Research to ascertain—by direct and careful experiment, extending over a wide range of individuals—whether any trustworthy evidence really exists on behalf of a distinct magnetic sense. The sectional Committee of that Society intrusted with this and cognate work has published a preliminary report,[1] which contains a fragment of evidence pointing in the direction of the existence of a magnetic sense in certain individuals. Three persons have been found by the Committee, who, when their heads were placed near the poles of a powerful electromagnet, could tell by their sensations when the magnet was excited or not. One of these "sensitives" told the investigating Committee accurately twenty-one times running whether the current was "on" or "off" from a peculiar and unpleasant sensation he alleges that he experienced across his forehead. Every precaution that suggested itself was taken to prevent the subjects gaining any information through the ordinary channels of sensation of what was being done at the contact-breaker placed in another room. But I am sure the Committee will gratefully welcome any criticism of their procedure or suggestions for future experiment which Sir William Thomson may feel inclined to give. The honorary secretary of the Committee is Mr. W. H. Coffin, Cornwall Gardens, S.W.

Two or three months ago one of the gentlemen who appeared to have this magnetic sense was in Dublin, and I took the opportunity of repeating with care in my own laboratory the experiments previously made at the Society's rooms in London. The result satisfied me that this individual did in general experience a peculiar sensation, which he describes as unpleasant, when his head was within the field of a powerful magnet. Nevertheless the keenness of his magnetic sense, if such it be, varied considerably on different days, and sometimes he stated that he could detect little or no sensory effect. Usually the effect was felt most strongly when the forehead was in the line joining the two poles; but one day, when he was suffering from facial neuralgia, he found that his face was the most sensitive part, and complained of a sudden increase of pain whenever the magnet was excited, his face being near the poles. Sufferers from neuralgia among the students of science may therefore have a new and useful career before them, in the pursuit of which

[1] *Proceedings of the Society for Psychical Research*, Part 3. (Trübner and Co.)